TITLE OF THE INVENTION

A DECLARATIVE METHOD FOR BUSINESS MANAGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

Business management has been traditionally viewed as a 'soft' art, subject to all the vagaries of human capacities and behavior. Corporations and other organizations, irrespective of the precise status of their legal existence, have been the continuously-modulated expression of their human employees' interactions with each other and external circumstances. While each organization was (when viewed from the outside) theoretically a collection of behaviors with defined goals, constraints, and activities, in practice, it was only the shadow of actions of the individuals who at that time were its ~~contituents~~ constituents.

Yet organizations and corporations persist over and past the tenures of their individual human ~~consituents~~ constituents. They develop patterns and knowledge which are transmitted to and through their human actors. If not now, in the near future, we will

see autonomous and automated agents implemented on computers acting for and on behalf of businesses. To the extent that these patterns and knowledge can be captured and transmitted, they are capable of being shared throughout any organization and across organizations.

This embodiment of the invention recognizes that for any business entity, and most particularly for those which extend beyond a single individual, a method of business management can be adopted that both creates greater attunement to current reality and operates to lead towards the entity's objectives. Furthermore, this method focuses on explicit and measurable progress rather than intuitive and innumerate operations and so can be more readily and rapidly improved upon or adapted to changing circumstances, both external and internal. Accordingly, while this method is stated as one for active managing of a business operation, it is also suitable for analysis of a business operation. Moreover, it can be used for any of manufacturing, process, or service businesses as long as their goals and operations can be specified as set forth below.

Most business entities have been functionally organized with a greater-or-lesser degree of hierarchical organization, wherein a first, higher, operating level tells a second, lower level what to do. This approach focuses on specifying for the 'subordinate' the details of his or her tasks, while leaving implicit the goal of such tasks. It also leads to a great deal of separation between the knowledge of the ultimate purpose of any operation and the knowledge of how such purpose is in fact being attained. Process information is at best implicit and often is neither recorded nor tracked. To a certain extent the business entity becomes its own 'black box' insofar as the capability of any one level to determine how well it is in fact functioning depends entirely upon the correct reporting up, down, and across the hierarchy or other management structure. Accordingly, though the preferred embodiment of this invention is stated for a single business entity, it can be applied to more than one, by handling any particular grouping as a 'black box' whose inputs and outputs, but not internal logic or operations, are all that need be measured and accounted for.

There have been many flaws found with the hierarchical, functionally-organized, traditional business management method. Solutions have been suggested ranging through the theoretically esoteric "management by objective" approach, to the 'total quality

initiative', to the more recent pop-valued "Ready. Fire. Aim" of popular business-management author Tom Peters. These solutions, while they have provided generations of consultants with work and fees, have not been adopted, for the most part, due to a number of flaws. Not the least of which is the lack of a means for instantiating such in a verifiable logical structure or using a non-human computational testbed. When your only means to simulate a new method is in the real world and failure is the price of any flaw, experimentation and testing becomes crisis-driven rather than proactive.

One approach in the prior art is referred to as the 'balanced scorecard' approach. However, this is a purely passive measurement divorced from action, and is furthermore not capable of modifying itself to meet internal flaws. Both of these weaknesses are eliminated in this implementation of the invention.

Two similar concepts, the first of building parallel, distributed systems, and the second of closed-loop control, come from the related fields of computer science and operations research. However, each mandates as part of their approach a single, rigid, and unitary solution to a particular problem, whose success depends solely on the original correctness of the model's meeting the real world. Since all models are by necessity and human limitations both inadequate and incomplete, and since the real world changes over time, these two methods lack the flexibility and adaptability of this embodiment of the invention.

The method proposed in this embodiment of the invention turns the traditional approach inside-out. It has the advantage over the traditional 'functional' approach of making crucial process information both measurable and explicit, rather than being left implicit. It has the second advantage of making the process information available to any element within the hierarchy (subject to message capabilities of the entity as a whole). It has the further advantage of letting the process and the results be measured for efficiency, enabling the distinction between performance and results which allows for finer-tuned management that no longer can as readily mistake good fortune for efficient use of resources. It has the still further advantage of allowing simulative rather than real-world testing of alternative methodologies and strategies, thereby creating an environment supportive of experimentation and advances. And it has the advantage of bringing the organization fully into the information economy by instantiating the organization as

information (as to goals and processes and knowledge combined), allowing a full and measurable capitalization of the human experiences which represent the real wealth of the new economy.

A further advantage of this method (a corollary of the third advantage mentioned above) is that it mitigates the risk and decreases the costs of learning by experience, both for each individual employee (at any level) and for the organization as a whole. Incremental, granular, operational responsibility can be tied more directly to both results and the processes by which such results were obtained, thereby allowing the evolution of finer-grained and subordinate rules for particular new situations. As this method produces both richer (in detail and number) and finer (in precision of both operation and feedback measurement) rules for operation, the entity as a whole grows effectively 'smarter' about both the external environment and about its own internal processes and interactions with said external environment, by developing through inference appropriate rules of behavior. Accordingly, the risk of a catastrophic failure affecting the entirety of the entity decreases with the spread of the new rules. So, too, decreases the risk of similar catastrophic failure for the entire system by the failure of any one particular operation or rule, or contradiction between any two rule sets. Failure of a rule at one level (whether of omission, i.e. the rule does not fire because the constraints and conditions were not properly stated or measured, or of commission, in failing to model the external world correctly) is less likely to cause failure of its parent rule. In one sense, this method empowers individual employees in the most strategic fashion appropriate to their operational capabilities and responsibilities.

A still further advantage of this method is that the increasingly fine granularity of the rules minimizes the cost of developing and testing proposed rules at a level above their proper scope, since each level inherits automatically the constraints and conditions of its predecessor and superior level. Any failure that occurs as a consequence of a developed rule being tested creates feedback that may be used, as claimed below, to redefine the higher level's constraints and actions so as to increase the chance of success for the higher-level rule. In short, the lower-level failure becomes feedback that improves both the lower and higher level's performance, over time.

Another further advantage is that the feedback process automatically provides insight into the performance and reporting between levels, thus allowing internal processes as well as external interactions to be observed. Because business objectives are stated as explicit goals, the business entity as a whole can accurately now measure its performance with far greater consistency and directly-focused applicability. Among the assessments that can be made are (this list is meant to be inclusive and exemplary, rather than exclusive): (1) accurate assessment of the risks of any decision or action at the level wherein such is made; (2) accurate assessment of the contribution of any rule towards the overall goal, with a minimum-cost / maximum benefit assessment of that rule in context being feasible; (3) accurate assessment of the deviation risk for any particular rule set, if the employees responsible for its implementation do not accurately implement the actions directed by their superiors and the current business situation(s); and, (4) accurate assessment of the relative efficiency of (a) the rule sets, and combinations of rule sets, which are active at distinct granular levels of the business entity; and (b) the cost/benefit incurred or gained by implementing finer-tuned rules and engaging in further hierarchical delegation of the current rule set, including in such assessment the increased frictional cost of additional information-passing around and amongst levels of the hierarchy as a consequence of such delegation.

2. DESCRIPTION OF THE RELATED ART

At present management is generally hierarchical, process-oriented, and backwards-looking. Management is hierarchical in that directions and decisions flow downwards while information flows upwards, with coordination between or across levels happening despite, rather than as a part of, the formal management process. Review of a business' processes, that is, of its entire reason for existence and practices, are directed by the higher levels rather than evolving out of the events experienced 'on the line', that is, by those individuals in contact with the world outside the business.

Similarly, management is process-oriented in that managers tell subordinates what they should be doing, and even how they should be performing their tasks. Managers act as the brains, while subordinates act as the muscles (in part due to the historical evolution of larger-scale businesses from the earliest manufactories). The evaluation of the

processes themselves, rather than the performance of the subordinates, is generally both limited and occurs only as a meta-level activity, though the venue of the 'suggestion box' provides at least a limited feedback channel.

Finally, management is backward-looking in that a new period's expectations are driven by the data of what happened in the past. Each quarter's activities are guided by projections from the records of the performance during past quarters (or longer periods). Production is driven by anticipated or projected sales, rather than by accumulated orders or proposed developments. Sales quotas are set by analysis of the past economic data concerning potential customers. The history of businesses operating in the era of mass production resembles the course of a vehicle being driven backwards with the driver peering into his rear-view mirror, with all the course-corrections, hesitations, false moves, and occasional crashes one could expect from the process of backing into the future.

Three common methods of management currently are, (a) Management by Objective; (b) Statistical Management; and (c) Work-flow Management. These are briefly summarized below.

In Management by Objective, managers set goals (objectives) which their subordinates must meet. The grounds for the goals, the consequences of attaining (or failing to attain) these goals on the rest of the business, and more detailed measurement beyond succeed/fail, are not considered pertinent in this approach. Subordinates are unable to examine (and possibly correct) mistaken assumptions which may lie behind the goals, erroneous processes which may interfere with attaining them, or suggest alternative goals which may better serve the grounds underlying the goals. Moreover, the feedback as to the effectiveness of this approach, being limited to a single value (succeed/fail), either requires such specificity and particularity in the goals as to make record-keeping too burdensome, or makes the records so indeterminate as to the quality of the processes by which the goals were attained in any given period that those records will not help improve future performance.

In Statistical Management, as many elements of a business' performance, and of the external world's conditions, as can be stated in objectively measured elements, are placed into some numerical (ordinal or otherwise) value. Then the performance of the

business is guided by the need to meet or otherwise explain these numbers. The largest two problems with this approach are: (1) there is no way to apply a self-correcting mechanism for failure to accurately state a value at any time, so inaccurate projections cannot be distinguished from failed performance; and (2) there is no way for the management to distinguish which of multiple approaches actually explains attaining the numerical values, making it impossible to do anything but guess as to which process that produces the numerical values also produces a superior business value. (For example, a sales volume requirement may have been met by stuffing a channel or by failing to meet unexpectedly high demand, but the volume alone cannot tell which occurred.) Even when augmented with statistical forecasting and modeling techniques, statistical management techniques fail to connect statistical values with operational procedures. In addition, they are not self-correcting, they do not encourage improvement of the model over time, do they do not provide fine-grained control, and they remain deeply mired in the historical trends rather than anticipating future requirements so as to allow agile response to changes.

Finally, a Workflow Management approach specifies the pattern of behavior that the individuals working in a business will engage in, usually in a temporal or causal sequence (production of a sub-part preceding production of the whole item that will be sold). The intention in this approach is to focus on the 'critical path' of events that must occur for an entire process to succeed. However, failure at any critical point leaves the entire business scrambling 'out of model' for alternative solutions and represents a breakdown of the management process (at least in a theoretical sense, though all too often also in a very real sense). Additionally, workflow models of a business are quite restrictive in that they do not directly incorporate any of the following: reverse flows (as required, for example, by manufacturing rework), conditional iteration, hierarchical workflows, or complex branching, and omit many other real-world business process flows. Instead, these must be indirectly and partially modeled, which results in a costly misalignment between the Workflow Management and business practice.

All of these weaknesses in current management practices are the consequence of separating process information from the feedback experienced when the business activities meet the real world conditions. All three of these separate decision support

(tracking of information about what occurred, relating the same to what was done, and predictive or analytical modeling) from decisive action, leaving the business prone to unexpected errors (subsequently explained away or covered up, depending on internal 'political' agendas of the subordinate managers), surprising and unexploited successes, or the vagaries of chance synergy between reality and model, rather than the conscious correction of the latter to the former.

Because the Zero Management Method avoids this separation (in fact, it actively seeks integration of these elements), it avoids these flaws.

SUMMARY

The Zero Management Approach, because it focuses on stating goals and incorporating feedback that continuously updates a business's model to the real world, is an approach that integrates transactional practice (how events occur), operational practice (how the business functions), and informational practice (what is done with the knowledge generated during transactions and/or operations. The information about a process (how it is to be done), its expectations (what the process is meant to attain), its context (what the real world conditions are actually like), and its results (what actually occurred), is integrated into the business model as these elements are known. Furthermore, the Zero Management Approach, by integrating the feedback into the business processes themselves, forms what can be described as closed-loop decision making, in which objectively-stated expectation leads to effort leads to result leads to feedback leads to improved objectively-stated expectation.

By stating the goals of a business in declarative form, wherein the goals are specifically stated as measurable objectives, and the means for attaining the goals in similar declarative form as rules, wherein the internal and external real-world conditions are used as preconditions that, when met, allow the rules to actuate, and then repeatedly circulating through the rule sets (with each rule actuating only when it is logically, that is, 'true' for it to do so), a business can focus on attaining its goals rather than on how it is acting. By further allowing the modification, deletion, and creation of new rules, and new rule sets, to meet or correct for increasingly detailed specifications, newly-perceived real-world truths, newly-determined business goals, and newly-encountered internal

contradictions, a flexible, adaptive, and dynamic method for business management can be realized which minimizes risks, allows for the capitalization of human knowledge, and moves from a production-push to a demand-pull method of management suitable for the modern era. As authority, responsibility, and accountability are delegated in a linked fashion to attainment of business objectives and subordinate objectives, internal and external flaws or differences between the business' internal model and the external reality are more accurately tracked and correctable with a minimum of management.

If instantiated upon a computer, the amount of detailed interaction and management that is needed to meet with real-world complexity and differences between projections, models, anticipations, and reality, are reduced. Moreover, continuous and incremental improvement at the most appropriate level of granularity of measurement and action can be devised and adapted through experience rather than having to be entirely pre-planned and specified. Furthermore, because the implementation can be both incremental and from either top-down or bottom-up approaches, an organization can adapt to the new method in that fashion most suitable to its current situation. And, finally, as the method can use logical contradiction as a means for improvement, rather than experiencing the same as a systemic or local failure, it can handle problems that other methods cannot, particularly if implemented upon a computer system.

DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

This embodiment of the invention and its features, aspects, and advantages will be better understood by reference to the accompanying drawings illustrating a preferred embodiment, in which:

Figure 1 is a graphical representation of how a business adapts current operational wisdom to this embodiment of the invention. "Managers" (1) identifies those human individuals within the business who have operational knowledge. Using any means to capture and represent this knowledge (2), each such individual will generate "Decisions" (3), which are then formulated (4) into one or more "Business Rules" (5). These are then combined across and through various levels (6) to form "Business Processes" (7), which are invoked and driven by outside events (8). As the evolution from human to

incorporated knowledge progresses, these 'standard operating procedures' form a "Business Auto-Pilot" (9), whose performance can be monitored by and against (10) specified metrics (11). Deviations, lapses, or improvements in performance when analyzed (12) are then used to refine and tune (13) any or all of the Decisions, Business Rules, or Business Processes (14).

Figure 2 outlines the major steps of the method described in this embodiment of the invention. In the first step (15), the objectives of a dynamic process (in this Figure, a for-profit business) are stated as measurable Goals. The Goals stated in (15) form a sub-set describing the objective of growing the business. In the second step (16) each production or process rule which drives growth of sales is stated as a condition plus action; according to (16), customers will have orders shipped when the item is in stock, but if the item is not in stock, a new one will be produced. In the third step (17), the delegation of duties relevant to obtaining customers and responding to customer orders is specified. The particular individual mentioned in (17) inherits the condition as a goal of 'Obtaining New Customer' from the existing rule (an intermediate step, detailing 'North American Sales' as part of 'Sales' was left out of the drawing as one obvious to any practitioner skilled in the practice of sales or business delegation). In the fourth step (18), the operation of the method becomes automatic as the external world is compared to the conditions stated in the Rules and the data concerning performance becomes updated as actions leading towards Goals takes place. The fifth step (19), is internalizing feedback by monitoring performance and the real world against the previously specified Goals, with specific handling of contradictions by internal modification until they are resolved.

Figure 3 is a general outline of how a computer program, or a device, for instantiating this embodiment of the invention can be created out of pre-existing, state of the art tools. The various software tools included in this Figure are generally available from a variety of vendors (e.g. Oracle, Sybase, Informix, Microsoft, SAP). Moreover, their creation is now generally feasible to practitioners skilled in the art of computer programming for manifold dynamic processes, let alone for businesses; there are entire industries now established which can meet individual customer's desires.

Figure 4 is a graphical representation of the process flow that might result from this embodiment of the invention for a particular dynamic process (or business). One

level of the business (20) delegates operational responsibility, authority, and accountability for a particular decision/action node (21) to a subordinate, and more finely detailed, level of the business (22). However, at this level a conflict is encountered when a logical contradiction is generated (23) when something is both true and false. Both sources of the ~~contradictino~~ contradiction can be clearly identified within the process flow known to (22). (An order must be shipped to meet quarterly sales quotas, though no product to fill the order exists.)

Figure 5 is a graphical representation of how, upon experiencing the logical contradiction set forth in Figure 4, the preferred embodiment of this invention uses the feedback to modify the method at the level where the contradiction is experienced, by modifying the process flow within (22) to include a new differentiation (between X and X') that ensures that the otherwise-contradictory value X generates a different response than NOT X does.

DETAILED DESCRIPTION OF THE INVENTION

The Zero Management Approach is a method for organizational management that is declarative rather than procedural, that focuses on correctly stating the goals, actions, expectations, and external circumstances as they are and as they are expected to be, in a fashion that not only allows but supports continuous adaptation and refinement to match reality as it is rather than correcting for mistaken plans as they were implemented. The method embodied in this invention is meant to apply to dynamic processes, i.e. processes that change the real world, including those changes which hold steady what otherwise would have changed.

The Zero Management Approach can be instantiated as a model of business organization, embodied in a computer program and applied to real-world problems of production, distribution, retailing, or service provision, or premanufactured and prepackaged and sold with the capitalization of extant business knowledge (operational and procedural both) specific and relevant for any of a number of specific vertical markets for the rapid transmission of business knowledge to new participants previously unused to modern market-oriented economic activities. It may also be used to preserve and store human knowledge (of actions, measurement, processes, organization, behavior,

and external conditions) to allow the effective and timely capitalization of such knowledge so as to prevent its being lost with the retirement, transfer, resignation, or death of skilled human employees and actors within an extant organization. This method shifts management from the projection and production 'pull' approach of the era of mass-production, to the demand-pull approach which is suitable for the new era of mass customization. It is anticipatory rather than projective, and thus minimizes the gaps between expectations (the model of the anticipated world) and reality. Furthermore, this method lets the real world conditions rather than projected anticipations govern the choice of actions, which allows changes to propagate on their own rather than requiring continuous and focused attention by management on how things are done and what actions are taken.

For clarity of disclosure, and not by way of limitation, the preferred embodiment of this invention is described in detail with respect to the operation of a business entity with distinct, differing, individuals and levels of operative responsibility. However, this invention is not so limited. From the following detailed description it will be apparent to one skilled in the art that this invention is applicable to entities as small as a single proprietorship and as large as the largest Fortune 100 multinational, publicly-held, corporation with layers of subsidiaries and clusters of cooperative and intertwined partnerships and subordinate corporations. Furthermore, it will be apparent to one skilled in the art that this invention is likewise applicable to dynamic processes in other fields.

For example, it can be applied to the management of a global multinational corporation with multiple national subsidiaries, all engaged in the production, distribution, and sales of technologically-undifferentiated, brand-dominated retail products in markets varying from mature to nascent, where the information about all aspects of the operation (from production through distribution to sales) are well-known and extensively analyzed by itself, competitors, and third parties. It could also be applied to the management of a nascent operation devising and defining both a technologically-advanced service and the market(s), channel(s), and customer(s) for said technologically-advanced service, where no one knows quite what is being sold, to whom, how, or for what in exchange.

This method provides for the most direct (in terms of applicability at the appropriate information/decision context) and effective (in terms of modifying the method and operations of the business entity as a whole) means for managing that business's operations, bringing into the closest congruence past plans, present objectives, constraints, actions, and responses, and future goals. Implementation of the decision-making and feedback systems is not imposed by any internal teleological imperative but by the external constraints triggering automatically the responses deemed most appropriate.

Definitions

A "Goal" is a preferred, real-world position. Goals may be relative ("15% more sales than last year at this time") or absolute ("Gross Income in the next fiscal year of at least $1,000,000.00"). A Goal has a truth value that the dynamic process is intended to change from false to true. A Goal may have a temporal mode, which in turn may be implicit, explicit, or undetermined (e.g. "Next year", "Next Quarter", or "Later".) Goals reflect the purpose of a dynamic process, that is, the change in actual state that the process is intended to bring about.

A "Rule" is defined as a pairing of Condition and Action. The triggering of any rule implicitly affirms that the Condition for that rule have been determined to be true, i.e. real. Both a Condition and a Rule may have zero, one, or more logically independent portions linked by any measurable operator.

A "Rule Set" is one or more Rules with at least one common Element, even if said common Element is only membership in the same Rule Set, gathered together.

A "Condition" is defined to be a particular factual circumstance in the real world, such as a market situation, a business event, or any other discrete and measurable happening or truth. Even an individual's decision (e.g. "It's time to start the fall inventory build-up") can become a Condition ("Time To Start Fall Inventory Build-up = NOW"). A Condition can be either a factual circumstance internal or external to a business or a dynamic process. A Condition can be quite complex, and can combine various factual circumstances, both conjunctively and disjunctively ("At least two out of three managers

agree to sell the company, and the cost/benefit of doing so meets our guidelines, but the market is not temporarily depressed").

An "Action" is defined to be a particular dynamic operation that will in turn create a new particular factual circumstance. An "Action" can be, for example, a business event (e.g. "Order new inventory"), a request to a human for information or for a decision ("Should we use supplier A or supplier B?"), a decision to set a new Goal ("Increase sales by a further 20%"), or a decision to set a new constraint ("No expenses above $5,000,000 may be authorized by anyone other than the president or treasurer"). Additionally, an "Action" can also include creation, modification, or deletion of a Rule (for example, when an internal contradiction is found).

A "Constraint" is a measurable value (such as the existence or non-existence of an item in inventory, the price of an item, or the presence of all necessary inputs for manufacturing an item) that must be satisfied, i.e. true, before a Rule incorporating that Constraint may be activated. The distinction between a Condition and a Constraint is that the condition permits a rule to activate if true, while a constraint prevents a rule from activating if true. (For example: "At least 20% of all sales by dollar value must come from products created within the past two years" is a Constraint.) The difference between a Condition and a Constraint may be in form ("If A is true" vs. "Only if not-A is not-true"); but it also may reflect how the dynamic process is to handle the real world problem of an unknown middle value that is not known to be either true or false.

"Measurable" means reducible to an objective and transcribable value. Measurable values include any numerical or ordered value, true or false value, membership of a set, any duration, or any particular mensuration. ("Sales of more than $2,000,000"; "Sales greater than last year's"; "from any EEC member"; "within thirty days of receipt of an invoice"; "weighing more than 30 tons".) A value that must be determined by a human being is measurable only to the extent that either all such possible values, or the process(es) for such reduction (including the specification of the individual human responsible for completing the process) are specified. (E.g. "One can like, be neutral about, or dislike, the product; these are the only emotional reactions we care about." "The wine is deemed salable for more than $5 per bottle by the senior oenologist on site at the time of bottling.")

"Delegation" is the assignment of responsibility, authority, and accountability for operational performance and reporting to a particular actor, whether human or automated.

An "Element" is any of a Goal, Rule, Rule Set, Condition, Action, Constraint, Measurable value, or Delegation.

In the preferred embodiment, the method in this embodiment of the invention is used for a dynamic process constituting a business, and consists of the following major steps:

First, the business' objectives are explicitly stated as a set of measurable goals and constraints. The degree of specificity is directly commensurate with the authority of the deciding and acting individual. Stating a business objective includes as a necessary step defining a successful outcome (defining an unsuccessful outcome is optional, but stating either an unsuccessful outcome or a durational limit to satisfaction is recommended to ensure that the objective becomes accessible to the feedback process). These objectives are stated declaratively and (in the preferred embodiment) are stated so as to be suitable for reduction to a form of or logic and instantiation on a computer. Though the latter step is not necessary, it promotes operational efficiency, greater certainty, and speed in continued dynamic realization of the method.

For example, a business' objective might be stated as "Ensure that every communication is responded to within the same business day as it was received," [measurable goal] "in order of priority and using the closest similar method outgoing as was used incoming" [constraints]. An executive vice-president may institute a further objective "Only pass directly on to me a limited set of communications for my personal handling of the response" [measurable goal] "those communications being, in order of priority: from known customers, from other individuals in this business (superiors before peers before subordinates), from previously-established vendors offering new items or changing terms of price, payment, or delivery, or from my family" [constraints], and pass this secondary objective down to the office receptionist.

This step is the most important of all the steps, as it defines for the business entity the sandbox, the game in which it is engaged, and the distinctions between winning and not-winning (which may comprise continuing to play, losing, or both). Measurable goals

are specifically stated in order to attain the following: (1) properly assess risks; (2) evaluate the minimum and maximum contribution of any rule to the overall goal; (3) determine the deviation risk for any particular rule set; (4) evaluate performance by any individual, against both their particular goals and the higher-level goals of the business; and (5) assess the relative efficiencies of (a) rule sets and combinations of rule-sets, and (b) finer tuning of subordinate rules, either new rules or new sub-levels of rule-sets (i.e. further delegation).

This step may be implemented from the top down, the bottom up, or any combination of both directions. Moreover, goal sharing, or overlap, both between disparate levels and across peer groupings, is explicitly permissible, thereby avoiding confrontation or race-condition problems.

Second, the means for meeting the business' objectives are stated as a set of rules. Each rule contains both a precondition and a response (also known as a condition and action). These rules are again stated declaratively; and they are stated as a set rather than in a hierarchy, thereby permitting their operation in any combination. However, the precondition of one particular rule may require the results of another rule, thus establishing their actual operation (in real-world circumstances) as a partially-ordered set (sometimes called a business process in the business community). This allows the business to continually modify its actual operation to the most effective set and dynamic pattern of operations by letting the real-world conditions, rather than an externally-imposed preconceived hierarchy of operations, dominate the business' behavior and interactions with the real-world through a dynamic, flexible, and adaptive model.

The identified actions of any set of rules become a set of objectives or goals which can be further delegated, and the means for meeting this further set of more detailed objectives can themselves be stated as a set of rules. This hierarchical process of defining delegatable objectives and the means for meeting them as a set of rules, the actions of which define further objectives, can continue to any degree of specificity or resolution.

In the preferred embodiment, any rule set will be incrementally augmented as more information about the real-world conditions and possible future states becomes

known. Developed rule sets need not be consistent at a particular level, as long as mutually contradictory sets cannot be invoked by identical initial conditions. (The only differentiation could be a last-minute random determination as to which set to invoke.) Rules will be stated in a form that makes explicit why actions are undertaken and what is to be achieved, rather than focusing (solely or foremost) on what or how something is to be done. Process information is thereby made explicit rather than implicit and, because it is tied to measurement, susceptible to comparison and improvement.

For example, if one rule set for the receptionist were to state: 'Upon entering the office, institute action to return all telephone messages before proceeding to act on the day's e-mail', and a second rule set were to state: 'Upon entering the office, institute action to return all e-mail messages before proceeding to act on to the day's telephone messages", these rule sets would be potentially inconsistent. Yet as long as a precondition is established to differentiate between them, no such contradiction would actually be encountered. (Examples of such a precondition might be: "Upon the vice-president's returning from an electronics forum, e-mails get priority"; "On Tuesdays, telephone messages get priority", or "In the absence of any other guideline, randomly select a rule-set and stick with it for that day, to test its effectiveness.")

One advantage of this method is that, unlike a hierarchical approach where a contradiction becomes a irrecoverable catastrophe, in this method a contradiction without sufficient differentiation can be rapidly identified and becomes the opportunity to correct, redefine, and re-partition the rule sets so as to remove a flaw in the business' operational flow. For not only can a general rule for handling contradictions be declared, but that rule can include in its actions the imperative and processes for modifying the business' internal rule-set so as to obviate further instantiations of such a contradiction by developing the proper differentiations at the correct level. (For example: "If faced with contradictory rules, if your rank is below vice-president, pass the contradiction along to your superior with a request for immediate clarification of what rule to instantiate to obviate such contradictions in the future and, upon receiving such a rule, include it in your operational guidelines; if your rank is vice-president or above, immediately instantiate a differentiation or make a personal choice as to which rule set to apply, record

your decision and grounds ~~therefor~~ therefore in a memo to the president, and then follow the selected rule set.")

Third, operational performance of the rules, and responsibility for attaining the predefined goals and obeying the predefined constraints, are delegated throughout the business to specific individuals, other business units, or even to automated subsystems. Subordinate rule sets inherit conditions as constraints, and actions as goals, and responses ~~or~~ to actions as conditions. Superior rule sets receive responses as results. Peer rule sets receive responses as conditions. Delegation automatically occurs as goals and constraints are handed 'down' a hierarchy of actors. Throughout the business responsibility, accountability, and authority remain linked. This alone solves a great many business problems within any organization.

In the preferred embodiment of this invention, delegation has three distinct phases. A manager 'delegates' operations to the extent that he passes down rule sets and the responsibility for carrying their dictates out. A manager delegates authority to the extent that he passes down the ability to establish, modify, or delete rule sets. And a manager delegates accountability to the extent that he passes down the ability to alter measurements (or methods of measurement) of the predefined success or the measurement-process itself. The delegation and the resolution of inconsistencies is always done in a step-wise, localized fashion rather than broadly and vaguely across the hierarchy as a whole, since the delegation is tied directly to the particular rules, constraints, and measurements assigned to each individual rather than to their place in a hierarchy.

For example, the vice-president and receptionist both inherit the top-level objective ("Ensure that every communication is responded to within the same business day as it was received") as a goal, the constraints of that top-level objective ("in order of priority" and "using the closest similar method outgoing as was used incoming") as constraints, and apply these to their own rule-set and actions. Thus the receptionist will pass on to the vice-president only those messages meeting the conditions of the additional rule ("pass directly on to me a limited set of communications for my personal handling of the response") and handle the remaining messages; and both will respond within the same

business day according to the constraints they are operating under. Failure to perform, or the need to alter a rule ("What do I do when a U.S. Government attorney calls for you?"), are equally measurable and serve as the inspiration for amendment, creation, or deletion of a rule at the level where the need to meet the real-world complexity occurs.

Fourth, the business' operation is made increasingly automatic, that is, responsive to external conditions rather than internal expectations, as the rule-satisfaction is made responsive to conditions as they exist in the real world and are applied to the rule-set(s). Actual implementation of business decisions and activities is governed by the satisfaction of the initial conditions for any particular rule or set of rules, which in turn initiates the operational process that produces measurable results. Even the failure to trigger a single rule, over time, can itself become the source of a rule and measurement; e.g. "If no sales of new product X are made within three months, cancel production of new product X." In the absence of specific rules on priority for actuating other rules, the entire set is continuously examined against existing conditions.

For example, each new incoming message would trigger the precondition for the rule stated above ("Ensure that every communication is responded to within the same business day as it was received"). If more messages are received at one time than can be responded to, either the first condition ("in order of priority") or second condition ("using the closest similar method outgoing as was used incoming") may govern the response. A lower-priority message may be responded to before a higher-priority message simply because the higher-priority message would require an asset (e.g. the fax machine) which is currently tied up with another response. Or the receptionist may delay responding to an incoming message while transferring the sub-set meeting the appropriate preconditions to the vice-president for his handling, as the best means of meeting the overall goal of responding to every message.

In the preferred embodiment of this invention, the instantiation of the rule sets and data describing both internal operations and goals, and external conditions and reactions, is continuously updated to match the reality as experienced rather than matching preconceived (planned) expectations. This prevents the disjunct between planning and reality that forces organizations into 'catch-up' or 'reactive' mode and best permits

proactive or forward-looking behavioral patterns to emerge. As soon as any trend or dynamic can be observed and reduced to a declarative statement (e.g. 'sales of low-end shirts, defined as costing less than $15, are down 20% over last year in the EEC') it becomes part of the rule set and can be used to govern future behavior, e.g: 'If anticipated sales are down below $Y0,000 in low-end products discontinue production contracts with high-cost, defined as > $2.50 per shirt, mills located where shipping costs exceed 10% of the production cost.'

Fifth, feedback is internalized, and becomes linked with, rather than disparate from, operations, as the processes for creation, deletion, modification, and correction of both objectives and means (or goals, constraints, conditions, and actions) are declared as explicit consequences of rules governing the business. (For example: "If no objective is met within a day, new rules specifying objectives that can and will be met within a day will be created, unless existing rules can be further differentiated to specify objectives that can be met within a day", can be a rule for modification. "If sales of all products do not include at the end of the year 20% by dollar value from products created within the past twelve months from the date of sale, research and development will be increased by 10% and managerial bonuses at all sub-units not meeting such goal will not be authorized", can be a rule for correction. And "If two rule sets are contradictory and after a year no measurable advantage can be perceived for following either one, despite random testing of each, then one such set selected at random shall be deleted", can be a rule for deletion.)

In the preferred embodiment, modification of a goal is done by creating a condition that when detected by the same level as a goal causes that level to modify its own rules (self-modifying), rather than requiring intervention of a higher level of the hierarchy.

Because the business' success, and thus that of the individual(s) acting on its behalf at any particular point, has been defined by measurable goals (i.e. actions inherited from superior levels), as soon as a point of failure (and the extent of the failure) becomes

clearly identifiable, at the same time that it specifies where the corrective measure should best be taken. This internalization of feedback produces a number of particular benefits.

First, the element of surprise accounting disappears, as events are monitored with regard to the real world rather than projected assumptions. Second, the disjunction between the levels of authority to act, operational failure, and accountability for failure, common to many current businesses, disappears. For if conditions are not satisfied (so no action took place) the level at which the conditions were incorrectly stated can be determined; while if conditions were satisfied but the action failed operational responsibility can be determined; and if conditions satisfied contradictory rule-sets the need for differentiation and instantiation of adequate differentiation can be determined and are automatically established at the appropriate level, that being where the inadequate differentiation became perceptible.

Second, since any failure creates its own feedback (whether the failure arose from inadequately determining real-world conditions, failure in operational action, or failure in adequate differentiation), the method adapts to both internal and external weaknesses and thus continually improves in a dynamic and flexible fashion. Changes are incremental and propagate throughout the organization (conditions being inherited and results being transferred upwards and sideways) with a minimum of supervision and hierarchical interference.

Third, the amount of risk experienced is reduced to the minimum possible at that particular level of specification. Because the rules are incrementally, and granularly, resolved the risk of rule (and thus process) error is decreased. Both the overall risk of a systemic rule failure, and the particular risk of a rule's firing (or not firing) are reduced; the former because the process information is made explicit and measurable, the latter because the failure is both accountable and can be isolated to the particular level of that rule's operation.

Fourth, the risk of delegation and increasing specification is reduced. The more granular, that is, the more particular the rule set of a subordinate level, the more feedback can improve that level without modifying a higher level and (through such upward modification) risking destabilizing or creating contradictions within a second, peer, level of operations. By distinguishing between operational failure and rule failure a distinction

between business assumptions, the real world conditions, and human performance becomes possible, allowing for corrective measures to be aimed at the precise weakness.

Fifth, composite goals can be met by being shared rather than dictated to disparate subordinate pieces. For example, a goal of maximal growth can be shared to five equal sub-divisions, each growing to the limit they can (dictated by external conditions and internal performances), without the higher-level manager having to either try to attain equal growth across all sub-divisions, overload himself with supervisory detail, or focusing on a particular sub-division to the exclusion of the other (and risk guessing wrong about the one most capable of lifting the entire group's performance).

In the best embodiment of this method, the modification of goals is done by creating a condition that requires the level of operations where that goal is specified to send a message that requires the goal to be modified, rather than forcing the message to pass upwards and the consequential modification of the goal to be passed downwards through the hierarchy. This is the equivalent of 'flattening' a hierarchy and putting decision-making operation, authority, and accountability into the hands of the employees best able to perceive both the need for and the direction of desired change. This closed-loop decision making, where action, measurement, correction, and reporting are all integrated, reduces the management effort required to the theoretical minimum and, as long as the model meets reality, to zero.

ZM CLAIMS DEPENDENCY TREE

EACH TAB INDICATES DEPENDENCE TO PREVIOUS LEVEL

31
- 32(iteration)
- 33(redeclare & restate as 2nd proc)
- 34(p.=bus.op.flow)
- 35(add an element after getting input)
- 36(assessment)
- 37(regulatory)
- 38(bus autopilot)
- 39(types of ordering)
- 40(inheritance)
- 41(change in constraints)
- 42(representation as symbolic or computer language)
- 43(adjust performance)
- 44(analyze bus. efficiency)
- 45(resolve ambiguous rules)
- 46(delegation to actor)
- 47(maintain consistency)
- 48(explanatory rules)
- 49(rule refinement)
    - 50(+reduce risk)
- 51(multiple levels)
    - 52(+form peer to peer)
    - 53(+hierarchy)
- 54(subordinate rule sets)
    - 55(+convey information between)
- 56(subordinate process)
    - 57(+no explicit ordering and second rule set is all satisfied rules)
- 58(anticipatory rule)
    - 59(+conjunct contrary to real world when defined)
- 60(stored representation to preserve human knowledge)
    - 61(+conveyance)
    - 62(+mult. kinds of knowledge)
    - 63(+reinstantiate knowledge)
- 64(business rules responsive to business conditions)
    - 65(+emergent business process definition)
    - 66(+goal rules with measurement)
    - 67(+risk management)
    - 68(+communicate by rules)
    - 69(+qualitative measure of effectiveness)
    - 70(+delegation of responsibility, authority, etc.)
        - 71(+via delegation rule)
        - 72(+authority over rule set)
        - 73(+2nd actor delegates authority via rule)
        - 74(+predefined success or meas. process)
    - 75(+identify 2nd actor via requirements rules and capabilities rules)
        - 76(+definitions of requirements rule)
        - 77(+definitions of capabilities rule)
        - 78(+match requirements and capabilities)
            - 79(+types of matching criteria)

80(adaptation process)
81(independent of any external agent)
82(+adaptation rule responsive to performance metrics)
83(+adaptation without higher level intervention)
84(+continuous monitoring and response)
85(+dynamic processes for - self- modification)
86(+resolve contradiction via differentiated rule)
87(+reduce operational latency)
88(+adaptation rule triggered by contradiction)
89(+conflicting elements with resolution)
90(+preclude simultaneous occurrence)
91(+resolve conflicting elements, no simul. satisfaction)
92(+by adding a constraint to one)
93(+adaptation rule corrects for failure)
94(+correct by altering either cause or effect of failure)
95(+via modify 2nd adaptation rule)
96(+nondetection of value)
97(+replace rule action with a process)
98(+correct either cause or effect)
99(+correct without human intervention)
100(+correct via modify subordinate goals or measurable goals)
101(+closed loop adaptation across levels)
102(+change element means change one of ...)
103(+overlapping goals across levels)
104(+overlap avoids confrontation and race-conditions)
105(+organizing rules across levels)
106(+form delegation hierarchy)
107(+rules across levels)
108(+levels are the same)

109(+change at least one rule in objective rule set)
110(business process via partial ordering and emergence)
111(apparatus claim)